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Arbor Day Tree-Planting.

TREE planting is, of course, not forestry, nor is there any close or necessary relation between them, but tree planting is itself a good thing if it is done intelligently. We need more trees, of the best and most suitable kinds, nearly everywhere in the settled portions of this country. If there is a fixed day for the work, at the proper season of the year, with ceremonies, social observances, and opportunity for "a few remarks," many persons are likely to plant a few trees who would not otherwise think of it. If good trees are selected, and they are handled with care and intelligence, both in the process of transplanting and afterward, we shall probably have, in the course of time, more good trees than now, and this is to be desired. A beautiful, graceful or majestic tree is a valuable possession for any community.

But the tree is not an end in itself. It does not exist for its own sake. It is valuable solely for its effect upon human health and human psychology, for its relations to the welfare of the men, women and children who see it. Whatever tends to implant or nourish right feeling about trees, or more intelligent regard for them than now prevails in this country, helps along a little the long, slow process of human development and elevation, which, with many fluctuations, goes on from age to age among the best races of mankind. The development of ideas connected with the subjects of forestry and landscape-art, and their continued discussion and illustration, are of value simply because they constitute a real and vital contribution to the sum of the forces by which human life is refined and strengthened, made more vital and interesting. This is an object in itself, and all means to this end are to be valued in proportion to their comparative efficiency.

The new interest in forestry and related subjects in this country is a natural development. It is time for it. It is an important next step in our national progress. The production among our people generally of a vital and intelligent appreciation of the true place of forestry and landscape-art among the forces which improve mankind would constitute a real advance in civilization. Whatever tends to increase popular interest in these subjects is to be encouraged, utilized and made more efficient. It is greatly to be desired that the people of this country should know more about trees, should think more intelligently of their varied relations to human life and welfare, and should become capable of deeper and keener delight in their exhaustless charm, and especially in their capabilities for the expression of ideas of beauty and of peace.

It is good to have people think and talk of these subjects until they shall be "in the air" everywhere. How to bring this about is a psychological problem, and most of our problems in this country are largely psychological. That is, they are questions of means and methods for the propagation of ideas—of the best way to go to work to produce the conditions of public intelligence, thought and feeling which we esteem desirable, and which will lead to more efficient action for right and noble ends. Arbor Day observances may be so managed that they shall be distinctly helpful. But all fine writing and long essays are a hindrance when we wish to accomplish anything. Tree-planting is a good object-lesson for the boys and girls of our country, if they learn to plant the trees properly, and with their own hands.

A general interest in trees, and in forestry and in landscape-art, would supply favorable conditions, soil and atmosphere for the development of just and rational taste regarding them, and of ability to deal with their problems successfully. Such results are impossible under conditions of national indifference and ignorance. A great musician could not be produced by a race which cared nothing for music. If all the men and women in this country who are working for any good object will help to make it the fashion to care about the subjects we have here discussed, they will find the material upon which they work, the minds of the American people, more tractable and responsive than they now are to all good and elevating influences.

Professor F. L. Harvey, in an address delivered in Bangor last month, gave the people of Maine some sound advice about the forest interests of the state which is of general application. The statement that "it is of the utmost concern to owners of timber lands, or those in any way connected with the lumber industry, that they inform themselves upon all matters relating to forest management and the care of lumber after it is cut, so that the greatest returns be realized from the money invested," may well be applied to lumbermen everywhere; and "the question for our lumbermen to solve, is whether they adopt the selfish policy of devastating forests for present gain, or whether, by proper care and management, and being satisfied with the annual growth, they will bequeath them to future generations with their original productiveness," is one which affects the whole country; or, at least, all that part of it east of the Rocky Mountains, where the control of the forests has now passed from the ownership of the government into that of private holders. The future, therefore, of all our eastern forests, is now in the hands of individuals, who are at liberty, of course, unless a very radical change in the control of private property in this country can be effected, to decide, each man for himself, whether he will turn his forest into money at once, or manage it in such a way that it will continue to be productive permanently to an amount equal to the annual increase of timber. That is, whether he shall manage his forest as a prudent farmer manages his land, and maintain and increase its productiveness. It must be remembered in this connection that the owner of a forest who allows it to be destroyed sacrifices one of the most permanently productive and stable of all properties; and sacrifices, moreover, the prospect for much larger returns in the future, when increased population and smaller forest areas in all parts of the world must inevitably increase the value of forest products.

Hints About Lawns.

TO one accustomed to the studious contemplation of natural scenery, there is apt to come, sometimes, the desire to possess some particular scene which has been found to affect the emotions—to own it as a pleasure and a means of refreshment to the mind through the eyes, as one might own a beautiful painting. The many practical conditions of life rarely permit the indulgence in such a luxury; but with the recurrence of the desire with each new experience, there comes to be an impulse that leads to the attempt to imitate certain elements of natural scenery in places in which it will be convenient to enjoy the result. There are many more who, while they are by no means students of Nature, yet have an instinctive appreciation of the beautiful and the picturesque in Nature, which manifests itself in the selection of their house sites, and in the general style at which they aim in their planting and other out-of-door work, rather than in the planning and carrying out of any consistent, complete ideal, or than in the imitation or perfecting of an existing natural scene.

There is, however, one type of natural scene, the beauty of which is so generally recognized, that every one who has the slightest opportunity desires to imitate it. It is that which is called a lawn.

Strictly speaking, the term lawn is applied to a natural opening, of limited extent, clothed with low verdure (grass or small bushes) and surrounded by woods dense enough to confine the eye. Its essential qualities are openness, breadth, seclusion and repose, together with a subtle combination of contrast (between its openness and the shady mystery of the wood) with harmony (the sense of seclusion being common to both).

In creating a lawn, considerable variation from the natural type is permissible, provided its essential qualities are preserved. For instance, the element of contrast with the wooded borders is heightened if the lawn is covered with an unbroken sweep of finely clipped turf, even though the lawn loses something of its charm of naturalness thereby. Likewise, it is not essential that the inclosing wood should be composed solely of large, tall trees, showing their trunks and with dark shadows under and behind them, nor that it should present a simple mass of foliage faced out or bottomed out with smaller trees and bushes, so that the interior of the wood is invisible; both of these conditions are common in Nature. Other minor features of woodland scenery may partially border a lawn, such as herbaceous plants, rocks, steep banks, or even water, but all such features should appear natural and subordinate. A lawn should have a moderately undulating surface, because a dead flat would be suggestive of artificiality. If a lawn is to be smoother than is natural, the turf must be kept short, preferably by the most natural means, as by the grazing of sheep. The difficulty of adjusting the planting of the borders of a lawn so that it will not be injured by the browsing of sheep or cattle has, however, led to the general use of the scythe and the lawn-mower, but the more natural way should be kept in mind and reverted to when practicable.

A lawn is often used, in connection with a house, as the foreground of a more extended, park-like opening or distant view. The extreme neatness usually desirable immediately about a house, suggests that that part of the lawn should be clipped, leaving those parts further away to be grazed. Such an arrangement is, in fact, common abroad, the pastured ground being cleverly separated from the clipped ground by a sunken wall (called a ha! ha!), or by a ditch with turfed slopes, deep enough to conceal a fence placed in the bottom, or by a river or elongated pool simulating a river. Even though the means of separation be visible, the disadvantage of the division in breaking the apparent continuity of the view may be, in a great measure, compensated for by the economy of pasturing over clipping and by the greater naturalness of the pastured lawn.

However intricate and irregular in shape a lawn may be, it should, as a general rule, have a predominating, central, unbroken area, in order to give it its characteristic qualities of breadth and repose.

The element of openness is essential. It is not uncommon to leave many existing trees scattered over a lawn or a single tree in the midst of it, or to plant trees promiscuously over it. This is usually done either from a love of trees as beautiful objects, or from the dread of a bare, unfurnished look. No greater mistake could be made.

It is with a lawn as with a picture. The subject of a picture should be at or near the centre, the composition should be such as to direct attention toward the subject, other objects shown should be subordinated to the subject, and there should be a border or frame to assist in confining the eye to the picture itself. So in a lawn, the eye should rest at or near the centre instinctively and easily, and since the turf is the characteristic and valuable thing, no other object should be allowed so near the centre or be so conspicuous as to distract the mind from receiving the impression which the lawn is calculated to produce. It would be as reasonable to put a large yellow star in the middle of a picture as to have a fountain or bed of flowers or a specimen tree in the midst of a lawn.

While there certainly is, in the long run, a more refined and lasting enjoyment to be obtained from a lawn the borders of which are so planted as to appear absolutely natural, and which makes a complete scene in itself, yet a good deal of the value of a lawn—its suggestion of simple breadth and repose—may be retained, while a certain amount of gaiety of foliage and of flowers, of interest in specimen plants, and of beauty of constructive art, is associated with it in the same view as a foreground, but not as a part of the lawn. There would be a contrast which might enhance the effect of gaiety, but at the expense of the lawn, because the sensation of gaiety and the interest in the artificial objects would overwhelm the milder, shyer feelings properly to be derived from the contemplation of the lawn. The one tires, while the other refreshes, the mind.

A lawn is at its best when there is no evidence of the handiwork of man—no formality in the grading, none in the planting, no exotic plants, no fountain-jet or basin, no vase or statue, no nicely trimmed path, no fence or formal terrace. Such a lawn conveys the purest impression and gives the most lasting satisfaction. One who cultivates a taste for formality and things evidencing the skillfulness of man is apt to tire of any one object or composition of that kind. It is true that there is a certain kind of refreshment to be obtained from variety in such things, but it is a stimulating, nerve-consuming kind of refreshment, the opposite of that which is encouraged by repose. But to one who cultivates a taste for the beautiful and picturesque in Nature, a single, purely natural scene is never tiresome if seen again and again. The infinite variety in the details and in their disposition, the differences of aspect caused by changes of weather and by the seasons, by the growth of plants, by birds and other animal life—all are harmonious with the natural scene, are not conspicuous enough to injure any artistic impression which the scene may give, and yet make the scene endlessly interesting.

Too often a lawn is spoiled for the gratification of tastes and pleasures that have nothing to do with the true source of the enjoyment to be derived from looking at it. And it is usually done, too, under the mistaken idea of decorating or improving the appearance of the lawn. That is the pity of it. For instance, it is not an uncommon thing to see a formal bed of scarlet Geraniums in the midst of a lawn that would otherwise have had much suggestion of a natural breadth and repose. The bed of flowers may be a good thing in itself. It is bright and gay, enlivening and stimulating, and it is well set off by the surrounding turf, but the lawn is sacrificed to it—that which has a permanent worth is made to give way to that which has but a passing value, a source of endless satisfaction to a pretty toy of which every one soon tires. Again, consider the case of a lawn "decorated" with statuary. A beautiful nymph splashing in a fountain, were it not a very hackneyed idea, and where it is the work of a true artist, would be a most enjoyable and valuable possession; but a poor, cheap, painted, cast-iron imitation of such a piece of sculpture, placed so as to dominate a fine lawn, is a barbarism which it is hardly conceivable that any intelligent person could be guilty of. The same thing might be said of almost all the usual so-called "decorations" of lawns. To decorate the face of a beautiful woman with painted ornaments would not be one whit more savage. Our civilization is spotted all over with the relics of barbarism; good taste is always striving to get rid of them, and they should be particularly avoided when we set about making a natural lawn.

Brookline, Massachusetts. *F. C. Olmsted.*

Autumn in Oregon.

A LARGE-LEAVED Maple (*Acer macrophyllum*) in the gulch above my house (the hills slope to the west) kept its leaves green this fall some six weeks longer than trees of the same species growing on lower land along the main creeks or in the gullies on the more open and exposed hillsides, and one to two weeks later than others growing in its own immediate vicinity. These leaves were green until the middle of November, while those of other Maples had begun to turn yellow by the first of October, were in a blaze of color by the 28th, and had mostly fallen from the trees by the 6th of November. Visiting this gulch November 18th, I found my Maple displaying a wealth of soft golden color that I have rarely seen equaled.

About its base, tall, straggling bushes of the Oregon Grape (*Berberis Aquifolium*) held their clear green, leathery, spinulose-toothed leaves, for these, too, like those of the bright and handsome Madroña, are persistent; but the Mock Orange (*Philadelphus Lewisii* (?)) and the little Snowberry (*Symphoricarpus*) had only a few pale, yellowish leaves remaining. The Ninebarks, too, were bare, excepting a few leaves on shoots of the present season. Some of the Hazels were still in full leaf, and, indeed, one bush was still fresh and green. Of course the Manzanitas (*Arctostaphylos pungens*, var. *platyphylla* (?)), near relatives of the Madroña, held their leaves—for these, too, are persistent. The little Tea brush, as we sometimes call *Ceanothus integerrimus*, still held many of its leaves; and the Rose bushes growing along the gulch were yet green, though in more exposed places the leaves of many of them were beautifully colored.

In southern Oregon—a region embracing that part of the state west of the Cascade Range and south of the Calapooya Mountains—we have many shrubs and trees, interesting by reason of their autumnal foliage, besides the large-leaved Maple and the shrubs already mentioned. Conspicuous among these is the large-flowering Dogwood (*Cornus Nuttallii*), which is very abundant here in the woods. The arrangement of the coloring on the leaves of this tree during the transition from its summer's green to its autumnal red is very fine, and is displayed in a great variety of forms. Later the color becomes more uniformly red, at which time the leaves are not nearly so pretty as they were before; but the tree—or shrub, it may be—then becomes a conspicuous feature in the landscape.

Even our two deciduous Oaks, *Quercus Kelloggii* and *Q. Garryana* (the Black Oak and the White Oak), often present great beauty in their autumnal foliage. This, it is true, does not occur on all the trees nor in every locality; it is observed most frequently on the more shrubby forms and on the hillsides, where the leaves are well exposed to the sun. Our common Poison Oak (*Rhus diversiloba*) often ornaments whole hillsides in the fall with the rich coloring of its foliage. In moist and shady woods the Low Oregon Grape (*Berberis nervosa*), a much handsomer shrub, I think, than even the larger *B. Aquifolium*, often shows great beauty of coloring, though, to be sure, its leaves are evergreen. Sometimes a single leaflet, or part of a leaflet even, will be colored a deep shining red, while all the others are of their usual bright green. Again the coloring will be varied by a dash of bright yellow, or of orange, with a sprinkling of the red. Our common wild Blackberry (*Rubus ursinus*), growing in similar localities, often displays great beauty in the coloring of some of its leaves, though this plant usually keeps its leaves green throughout the year.

The Wild Grape (*Vitis Californica*) is very abundant here. In default of any support this plant will form clumps upon the ground; but, wherever it has the opportunity, will climb lofty trees; smaller trees it will frequently completely cover with a mass of foliage. In the fall these leaves become usually of a deep crimson color, but with an almost infinite variety of marking and mottlings, shades and tints.

But by far the richest, most varied, most beautiful and most profuse display of coloring in this region is seen in the dying leaves of the Vine-Maple (*Acer circinatum*). I should despair, however, of giving anything like an adequate description of these, and can only say that the leaves—delicate of texture and beautiful in form, borne on the branches of long, straggling stems, and thrust out, therefore, to long distances in every direction, often intersecting the foliage of other shrubs and trees, contrasting finely with these and with the much lighter and more uniformly colored foliage of its large-leaved relative, *Acer macrophyllum*—display the most beautiful and varied arrangement of the different tones of crimson and scarlet, of yellow and green, it is possible to conceive.

When these shrubs and trees are decked with their October coloring and scattered among huge Douglas Spruces, Yellow Pines (*Pinus ponderosa*) and White Firs (*Abies grandis*)—the most beautiful, to my thinking, of our Conifers—the effect is most pleasing, and it is often heightened by vines and trailing plants that carpet the ground on every side. Among these last are *Whipplea modesta*, *Linnæa borealis* and the Yerba Buena (*Micromeria Douglasii*).

We have here in the spring and in the summer a wealth of wild flowers, the ground in many places being literally covered with different species in succession. But as the season proceeds they disappear, and now one or two late-blooming Polygonums are about the only things left, except a few scattered individuals of a little Blepharipappus (*B. scaber*) and an occasional Monardella (*M. odoratissima* (?)), called Pennyroyal here, from the odor of its leaves.

But the vegetation has started finely again since the rains have come, and many species of plants that will not bloom until spring are now clothing the ground with a carpet of green.

During our mildest winters the wild strawberry blooms sparingly all winter; the same is true of a little Ranunculus, and the pretty little *Dentaria tenella* may nearly always be found blooming in January. In most places in the timber *Synthyris rotundifolia* always begins to bloom by the holidays, or a little later. *E. W. Hammond.*

Wimer, Oregon, November 28th.

Foreign Correspondence.

London Letter.

THE nurseries of Messrs. Hugh Low & Co., of Clapton and Enfield, are amongst the most famous plant factories in the world. In England they have for many years held a position almost unique. Their trade is almost exclusively with other nurserymen, the hundreds of thousands of plants of all kinds annually grown there being dispatched every autumn to nurseries all over the British Isles, and even to America. The two nurseries contain glass structures, chiefly houses, which cover an area of upwards of 300,000 superficial feet. These are filled with enormous numbers of all kinds of ornamental plants, everything likely to sell, from fifty-guinea Orchids to sixpenny Genistas, being represented by hundreds, thousands or tens of thousands. Specialists the Messrs. Low & Co. certainly are, but they make a specialty of almost every good garden plant. The extent and work of this establishment are almost unknown outside what is termed the trade. I lately had an opportunity of inspecting the contents of both nurseries, and as these appear to me to be a sure index to the horticultural tastes in England at the present time, it seems proper to devote a letter to an account of some of the most noteworthy of the plants there.

The nurseries at Clapton are about five miles from the city. They were founded in 1820 by Francis Henchman. At that time New Holland plants were in high favor, and Henchman sent a collector to Australia to obtain plants and seeds. The Clapton Nurseries soon became famed for choice and new Australian plants. This expedition, alone, cost Henchman over £1,000. Mr. Hugh Low was at that time manager. He afterwards became sole owner, and continued to collect and cultivate Australian plants, Cape Heaths, and hard-wooded plants generally, until his death. His son, Stuart Henry Low, is the head of the present firm. He has made his nursery as famous for Orchids as his father did for New Holland plants. He was one of the first to send collectors for Orchids, and he has continued to employ a number of them, from whom enormous quantities of all kinds of Orchids are being constantly received, and not always alive, Mr. Low significantly remarked. The greater portion of the glass structures at Clapton are devoted exclusively to Orchids. Some idea of the magnitude of the collection may be obtained from the fact that five houses, each eighty feet long, and each containing nine feet width of staging, are filled with the following species of Cypripedium: *C. niveum*, *C. bellatulum*, *C. lævigatum*, *C. Haynaldisnum*, *C. hirsutissimum*, *C. Sanderianum* and *C. Lawrencianum*. These are each represented by thousands of plants, all in perfect health, and mostly in five-inch pots. Of *C. Lawrencianum* there were probably 20,000 plants, and the richly variegated foliage of these fields of leaves was a glorious sight. *Cattleya Mossiæ* entirely filled a gigantic house 150 feet long, with fifteen feet width of staging. The display of bloom in this house when the plants are in full flower must be a grand picture. Another house, equally large, is filled to the door with healthy plants in all sizes of *Cattleya Gaskelliana*. Bushels of flowers were cut from these plants this autumn. There can be no question of the superior qualities of this species as a garden Orchid. The three kinds of Cattleya which I should be disposed to name as the best of all Cattleyas for the million are *C. Trianæ*, *C. Mossiæ* and *C. Gaskelliana*. Thousands of plants of *Phalænopsis amabilis*, *P. Schilleriana* (now a comparatively rare species in a wild state, I am told) and *P. grandiflora*; hundreds of the variety of the latter known as *aurea*, also of *P. denticulata* and *P. gloriosa*, all in good health, many of them recently imported. *Aërides expansum*, *Saccolabium guttatum*, *Cymbidium Lowianum*, *Dendrobium Brymerianum*, *D. suavissimum*, *D. Cambridgeanum*, *D. nobile* in variety, and many other species of Dendrobium; *Vanda Amesiana*, *Angræcum citratum*, *Lælia purpurata*, *Cattleya Mendelli*, *C. Gigas*; these were all represented by hundreds or thousands, mostly the latter. I have mentioned only those species which

are grown in these nurseries in surprisingly large quantities. The numbers given must not be taken as exaggerations; they are astonishingly large, but they represent the facts. The Odontoglossums at Clapton are almost as sand on the seashore. In their long houses they suggest huge beds of Leeks. A large house is filled with plants of *Cœlogyne cristata*, some of them being very large specimens. They are planted out in beds, and apparently this treatment agrees with them. In addition to the above popular Orchids, Messrs. Low & Co. have a great number of varieties, Cypripediums being conspicuous amongst them. But units in such an immense collection do not get even passing notice from a visitor. The question one naturally asks on seeing these hundreds of thousands of plants, the bulk of which have closely followed after others which have been sold, is, What becomes of them all? It is almost distressing to have to admit that most of them must perish through improper treatment. If it were not so Messrs. Low & Co. would soon choke the horticultural world with Orchids.

But Orchids are only one of the specialties of this firm. Hard-wooded plants are grown in thousands, both at Clapton and Enfield. At the latter nursery there are about eleven acres covered with glass. The form, size, internal arrangement and general plan of this extent of plant houses are of the most perfect kind. The nursery is only young, but neither pains nor expense have been spared to make it capable of performing the work intended in the best and cheapest way. The houses are of great length and grouped in dozens. Each group has walls only on the outside, so that practically it may be called a large, low house, with ridge and furrow roof. Necessarily all the houses in the group are of the same temperature. It is only when looking below the stage that the absence of partition walls is seen; above the stage each division appears to be a house by itself.

Enfield is famous for its market gardens. It stands high and is practically in what we call the country. The growth made by the plants there is astonishing—in England, at any rate. Thus, Tea Roses only ten months old have shoots six to eight feet long, many of the plants having half a dozen such shoots. The plants are grafted in December and ready for sale by the following September. Clematis, the same age, were equally large. Amongst the plants grown for their flowers in winter I noted: *Acacia armata*, many thousands; *A. Drummondii*, hundreds; *Erica hyemalis*, *E. gracilis*, *E. persoluta alba*, Genistas, many thousands; *Polygala acuminata*, *Choisya ternata*, beautiful little pot-shrubs, well branched and full of flower buds; Tremandras, *Thibautia acuminata*, *Fabiana imbricata*, a first-rate pot plant, with white, tubular flowers, not unlike some Ericas; Abutilons, many fine varieties—Lemoine's, I believe—all in full flower at Christmas time; Ivy-leaved Pelargoniums, Epiphyllums, *Tecoma capensis*, with large heads of brilliant scarlet flowers, on plants about two feet high; Gardenias, Callas and *Daphne Indica*. These are all grown in very large quantities, few, if any, being in a larger pot than a six-inch. Of Palms, such as Kentias, Latanias and *Phœnix rupicola*, there are hundreds of thousands, from seedlings up to handsome table plants. *Lomaria gibba* is grown in thousands, and is one of the most popular of all Ferns for decorative work. *Cyperus distans* of gardens, which is *C. Meyenianus* of Kunth, the handsomest of all "grasses," as a pot plant fills an enormous house. *Celosia pyramidalis*, an improved strain, is here grown for the sake of its flowers in winter. The seeds are sown in July and by the middle of December the plants are in full flower. There were white, yellow, rose and crimson flowers amongst them. For cutting, I imagine, these plants must have great value in winter. Bouvardias are very largely grown, several large houses being filled with shapely, well flowered plants when I saw them. The best kinds were Humboldtii corymbiflora, Jasminoides, President Cleveland, Dazzler and Maiden's Blush. A house full of *Asparagus plumosus* was pointed out as "all we have left." For cutting, as well as a pot plant for table decoration, this graceful plant has very few equals. It is easily grown, easily multiplied, and stands much longer than any Fern. A large piece of naked land had just been cleared of dwarf Roses, most of which had gone to America. Rhododendrons, the Javanese kinds, are grown in large quantities, and many of them flower in midwinter. There can be no question as to the large place these plants are destined to soon fill in winter floral decorations.

I have only mentioned those plants which are grown in exceptionally large quantities, or which are comparatively unknown as useful winter-flowering plants. In America most things are done on a big scale, but I doubt if you have anything in the nature of a plant factory to compare with that of Messrs. Hugh Low & Co. *W. Watson.*

Kew, December 28th, 1888.

New or Little Known Plants.

Ilex Amelanchier.

THIS shrub, of which our figure upon page 41 is the first which has been published, is one of the rarest and least known plants of eastern North America.

It is the *Ilex Amelanchier** of M. A. Curtis, who described it from specimens gathered by himself nearly thirty years ago in a swamp near Society Hill, in South Carolina, the only station in which this plant has been seen in recent times. A specimen of what is evidently the same plant is preserved in the Gray herbarium, labeled "*Prinos corymbosus*, Ph. Herb. Barton (from Bartram's Garden, from Machorin Rives)." No such name, however, was published by Pursh, and the source whence Bartram obtained his plant is, to say the least, vague. Another specimen of this plant in fruit is preserved in the Gray herbarium, labeled "Drummond in Herb. Hooker, Alabama or Covington." It is probable, therefore, that it will be found in other parts of the country besides the Society Hill swamp. This plant seems to be cultivated in England, as I possess a specimen made by Mr. Nicholson (No. 2,074 of the Kew Arboretum herbarium) without flowers or fruit, which clearly belongs here, although labeled *Prinos lanceolatus*, Pursh. *P. lanceolatus* is a very doubtful plant, entirely unknown to American botanists, and probably founded upon the figure in Hill's "Vegetable System," published in London in the middle of the last century. Pursh, however, who claims to have seen a specimen of this plant, describes it in his Flora, ascribing it to the low country of Carolina and Georgia, and his characters are copied by Chapman in the "Flora of the Southern States."

Our figure is prepared from one of Dr. Curtis' specimens, who described his plant as a shrub three to six feet high. It is to be hoped that its publication may draw the attention of botanists in the South Atlantic and Gulf States to this plant, and to the other southern species of the Prinos section of Ilex, which are still insufficiently represented in herbaria, and very imperfectly known. *C. S. S.*

* "*Ilex Amelanchier*. M. A. Curtis. Leaves oblong, barely acute at each end, serrulate, pubescent, and finely reticulate beneath; fruiting pedicels solitary, as long as the petioles; drupe large, red; nutlets strongly three-ribbed on the back; calyx-teeth acute. Leaves about two inches long, one inch wide. Drupe three to four lines in diameter."

Cultural Department.

Sub-irrigated Gardens.

IN the advertising of Florida as it has been carried on for a score of years, the practice has been to hold up the orange as the leading attraction, while market-gardening is made to figure as a secondary industry, a degree less genteel than orange growing, but a very convenient resource for meeting current expenses "while the grove is coming into bearing." However the other industrial resources of Florida may stand the test of experience, candor compels me to say that market-gardening in this state, as a rule, is as precarious an industry as can be engaged in. In the neighborhood of the leading winter resorts, where there is a good local demand, vegetable-growing may prove profitable, especially if no severe frosts occur in winter. Strawberries pay well where they are grown systematically, as at Lawtey, and good shipping facilities are at hand; but as a rule, market-gardeners hardly recover expenses.

With natural waste, stealage and high freight-rates, the net returns from market-gardening seldom exceed the expenses of packing and production. Other obstacles which are encountered alike by those who grow vegetables for marketing or home consumption, are found in the chances of severe frosts in winter and drought in early spring, the latter amounting almost to a certainty. In the southern half of the peninsula danger from frost need hardly be taken into account, but in the northern half, winter gardens, which are the only ones planted for profit, are constantly in peril.

Droughts in Florida are particularly trying on cultivated plants whose feeding roots are within a foot or two of the surface. The soil in nearly all parts of the state is sandy, and lacks the capillarity by which soils of firm texture are enabled to withstand droughts. This evil is increased by tillage, which sepa-

rates the coarse particles still more from each other, and it is lessened by admixture of such substances as lime and muck. On wild vegetation, growing on undisturbed land, drought seems to inflict less damage than it does in other states. Without pausing to consider these seemingly contradictory phenomena, it suffices to say that the spring drought in Florida is an obstacle that cannot be overcome or counteracted except by some system of irrigation.

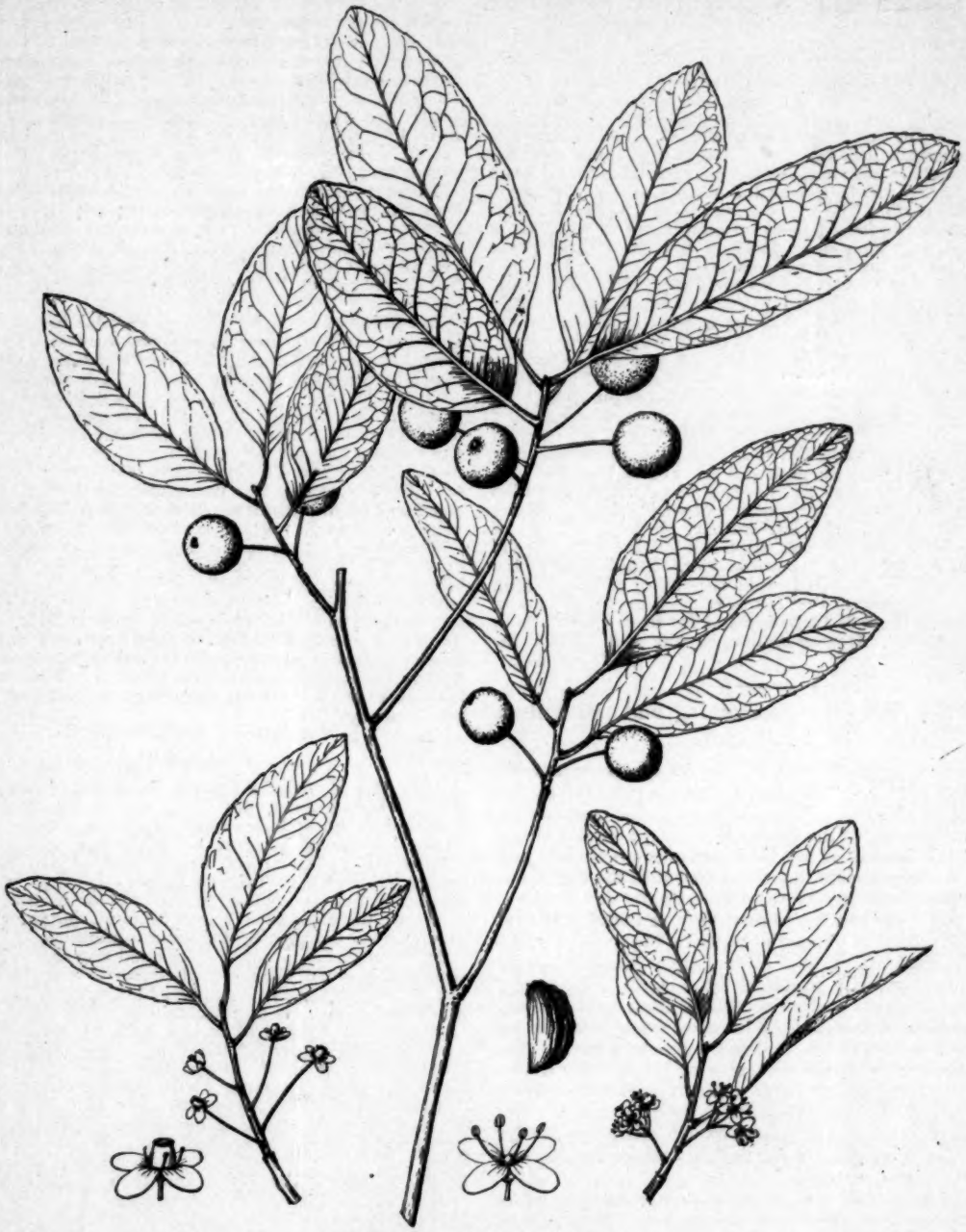

Fig. 88.—Ilex Amelanchier.—See page 40.

In a soil so porous as that of Florida surface irrigation is impracticable. Windmills and other mechanical means of raising water are too expensive, except in peculiarly favorable locations. Artesian wells are most satisfactory, but they are not for poor men; and after a flow of water is obtained there arises the problem of distributing it to best advantage.

On the eastern coast of Florida, at Daytona and a few other places, there has come into use within two or three years a system of sub-irrigation, which answers admirably for what may be termed intensive gardening, and in localities where there is good demand for garden produce. It is a modification of Mr. A. N. Cole's system—an adaptation of it to sandy land, the principle involved being the retention of water supply just beneath the roots, so that by capillary action it may readily be supplied to them as needed. The first essential is an abundant supply of water, as from an artesian well, and the second is a subterranean reservoir or trench which will retain a small quantity of water, and allow an excess, as from heavy rainfall, to escape.

The productiveness of the first gardens thus irrigated was so surprising that last winter a stock company was formed, with a capital of $50,000, for the establishment of an extensive garden at Ormond. In their construction parallel trenches are dug two hundred feet long by four feet wide and twenty-two inches deep, they being sixteen feet apart between sides and ends. A thin mortar is then prepared, composed of one part

Portland cement and seven parts sand, which is poured over the bottom within a rough curbing of loose boards. After being smoothed to a level by drawing a short piece of timber over it, this bed is allowed three days to harden. Then a border is made all around by pouring the same kind of mortar between two courses of boards four inches wide, set on edge one inch apart, the space within the border measuring two hundred feet long by three feet wide. After the sides have been left three days longer to harden, the inner boards are removed and the whole inner surface receives a thin coat of pure cement in order that it may be water-tight.

At either end of the cemented bottom are set wooden boxes six inches square, rising six inches above the surface of the ground. Through these the gardener may see how much water is in the trench, and regulate the supply accordingly. Next to these are laid lengthwise of the cemented bottom five courses of narrow inch boards. Crosswise of these a second layer of boards is put on closer together than the first. Then Palmetto leaves are laid over the boards and the trench is filled in with earth. The water from the well is led through the garden in two-inch pipes and distributed to the beds in half-inch pipes, which open through faucets in one of the boxes that lead to the bottom of each bed.

It is found that by keeping up the supply of water in the trenches the ground over and between them is kept sufficiently moist in the driest weather, and that a most luxuriant growth of vegetables can be obtained. In order to economize space, different kinds of vegetables are planted in alternate rows—for example, several rows of Beets, Radishes and Lettuce between two rows of Cabbages. A close succession is kept up also, the intention being to have the ground constantly and fully occupied with the most profitable varieties. The cost of such beds is considerable, but it is found that one measuring four by fifty feet can be prepared for $15 or $20, and this affords a garden spot sixteen by sixty-six feet in area, on which may be grown a very large quantity of vegetables of quality and size not obtainable in any ordinary garden. An acre of ground thus prepared costs $1,000, but it is believed that it will produce to the value of $3,000 in a year. The length of the growing season in Florida is greatly in favor of this system, and it is not improbable that it will come into general use in localities where there is large demand for fresh vegetables in winter and spring. It is, of course, equally well adapted for flower-gardens.

A. H. Curtiss.

Jacksonville, Fla.

The Relation Between Blossoming and the Tubers in the Potato.

THE following abstract from *Annales Agronomiques* of a paper by Dr. E. Wollny has, perhaps, a practical as well as a botanical interest. Whatever may be the case in Germany, the flowering of the Potato is usually abundant here, but in a large portion of our best varieties no fruit is produced. It is not probable that the removal of the flowers of such varieties would in any way increase the development of tubers. If, however, the removal of the young tubers as they appear would increase the vigor of the growth of the flowers, this fact might be of advantage to those who are trying to produce new varieties from seed. It is now almost impossible to secure seedlings from some of our choice varieties, although they blossom freely. Some investigations by Dr. B. D. Halsted seem to indicate that failure to set fruit is due to defective or imperfectly developed pollen. It might be worth while to remove the young tubers from some of these varieties as they appear, in order to ascertain whether this treatment would encourage greater vigor in the development of the pollen, and the consequent production of seed.

In the climate of Germany the blooming of different varieties of Potatoes is very much restricted. Most of the varieties do not flower, excepting here and there in the course of years; a small number only flower regularly and bear fruit. It is not so in Chili, the habitat of the Potato. There it flowers abundantly, but the tubers remain small, while in the temperate zone the formation of the tubers is favored at the expense of fertilization.

This fact seems to indicate a sort of balance between the two modes of reproduction by the tubers, and by the seeds: the energy of the one seems to bring about the decadence of the other. In fact, Knight and Langenthal have found that they may increase the blooming by detaching the young tubers as they appear. Inversely, they found that suppressing the flowers favored the development of the tubers of many varieties. An anonymous English author has obtained by this method an increase in harvest of 2,670 pounds per acre.

Wollny recognizes that, from his experiments, the development of the flower is prejudicial to that of the tubers. Experiments were conducted in 1886 on many varieties that produce flowers. Four plots were planted with each variety, one acting as a duplicate or control, being left to itself; the inflorescence on the other three was cut at three different periods. The inflorescence oftenest cut off produced the crop of greatest weight; it also exercised an influence on the number as well as size of the tubers. However, the early varieties, and the plants which had not been topped till late, gave a contrary result, one crop being poor, probably because there remained some little time between the operation and the maturity of the tubers, and the season had been especially dry from July 14th to August 25th.

These experiments enable us to understand why the Potato does not thrive alike in Chili and Germany. It is probable that dryness and sunlight induce bloom, and humidity, and a sky more or less cloudy, the formation of tubers. In fact, in dry years a great number of varieties flower, while the same varieties do not bloom when the weather is moist and the sky is obscure.

The influence of light upon the production of flowers is a fact that has been long known, and very recently Sachs has shown that it is the chemical rays which provoke flowering. Plants of Nasturtium, a flowering plant of the first class, produced no flowers behind a screen of a solution of sulphate of quinine. But it seems to us that it is necessary to divide the problem into two, and to distinguish one immediate influence and another indirect influence, the effect of which is itself accumulated by heredity, in order to become a race characteristic. These two features necessarily combine, and act in the same way in our country. We do not think, however, that these things are brought about by purely physical influence.

There are, in fact, many examples of plants being reproduced artificially or naturally by budding, root-grafting, tubers, etc., and which in flowering do not produce fruit, or which, producing fruits, are none the less sterile, as seeds are not formed in them. *Lysimachia nummularia*, a creeping plant; the Tarragon, which flowers but does not set seed; *Garlic rocambole*, which produces bulbs in place of flowers; a variety of *Ficaria ranunculoides*, which produces tubercles in the axils of the leaves; and Sugar-cane and Bananas, which are nearly always sterile.

Rose Notes.

JANUARY is one of the most critical months of the year to the Rose-grower, not only because the flowers are in greater demand at that season than at any other during the winter, but also on account of the weather, which in this latitude is usually severe and frequently dull. It therefore becomes necessary to exercise greater care in watering, as excessive moisture, either at the root or in the air, proves injurious, the diminished sunshine rendering the evaporation much slower than during the autumn months.

As to ventilation, it may be repeated that fresh air, carefully admitted, is one of the most valuable aids to the Rose-grower, but no hard-and-fast rule can be laid down for this operation, as it depends entirely on the condition of the weather. Similar advice may be offered in regard to firing, as this part of the work also needs careful handling to keep an even temperature of from 55° to 58° at night, this being found most satisfactory for an assortment of varieties. More Roses are injured by too high a temperature than by allowing the heat to fall a few degrees below the standard mentioned. It should be remembered that the original species, from which our fine varieties have been derived, were found in temperate climates, and it is only reasonable to suppose that their offspring will flourish under somewhat similar conditions as to temperature, although some allowance should be made for the extra stimulation required for the production of a succession of flowers at this season.

The effect, also, of any previous error in management, will be more noticeable at this time. Such mistakes, for instance, as the dangerous plan of running the houses at a specially high temperature just before the holiday season, to open an extra quantity of flowers, is a practice almost invariably followed by so great a falling off in the succeeding crop as to more than counterbalance the advantage gained.

Where a stock of young plants has been secured from early cuttings, some of them may now be ready for repotting, and

this operation should be attended to as soon as the roots are in a condition to require it, for when the plants are allowed to become stunted much valuable time is lost while they are recovering their vigor, and in some cases permanent injury follows.

Unless already provided for, no time should now be lost before putting in Rose-cuttings for the stock of next season, so that the plants may be in readiness for timely planting. It has been often proved that while a good crop of Roses may sometimes be secured from late planting, it is far preferable to have a strong and healthy growth and well-established plants before the dark days of early winter set in.

Holmesburg, Pa. *W. H. Taplin.*

ately light loam on shallow benches, on which the depth of soil is from four to five inches. *W.*

Philadelphia, Pa.

Polyantha Rose, Mme. Georges Pernet.—The Polyantha Rose is year by year claiming more attention from American Rose-growers, and, as many of us think, quite justly; we doubt, though, if any considerable number of the Rose-loving public appreciate as they should its sterling merits. The dwarf Polyanthas are perfectly hardy, and will endure many degrees below zero with but slight protection. For the edging of beds or for running lines, they have no superior. Several introductions of late years in this class have evidently the blood of the Tea Rose in their veins. A question may be raised as to the

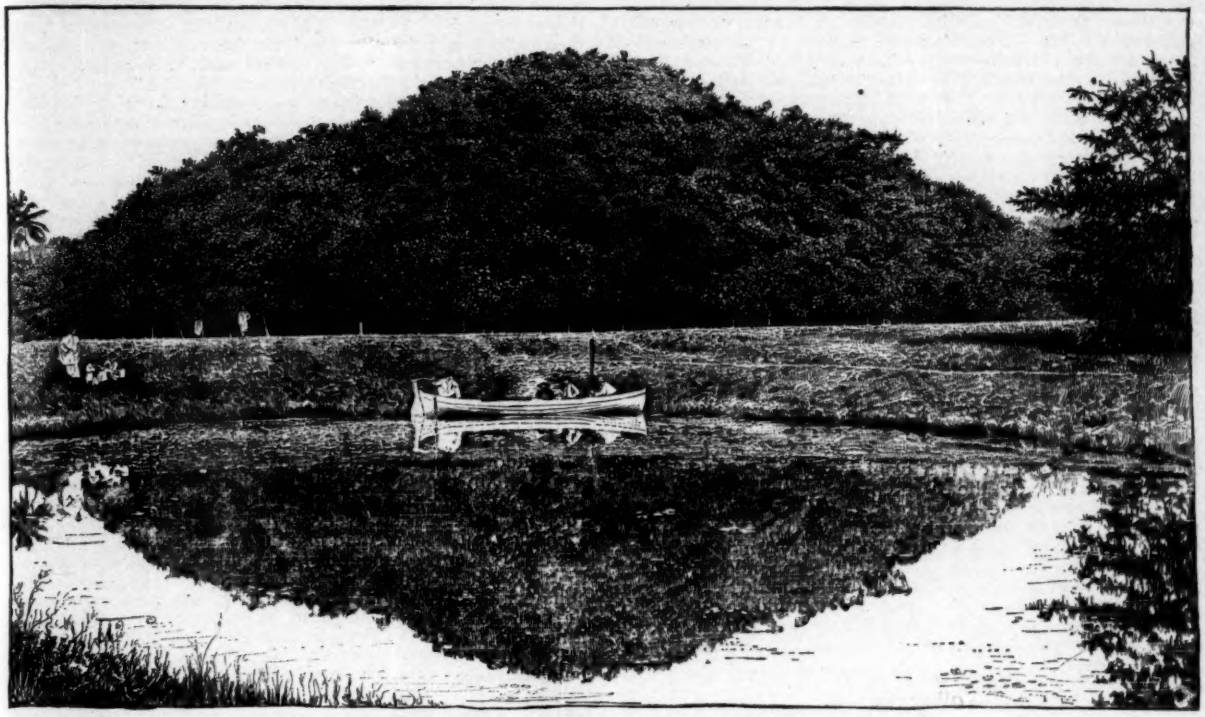

Fig. 89.—The Banyan Tree in the Botanic Garden, Calcutta.—See page 44.

The Hybrid Tea Rose, Puritan.—This Rose, like many other new varieties, was presented to the American trade with the highest testimonials, but the result, as is well known, has been a disappointment in a majority of cases, even in the hands of growers successful with other kinds. It would be both unwise and unfair to condemn a new Rose before a careful and thorough test had been made of its capabilities, but in the case of the Puritan a test of three seasons' duration has not proved it to be a commercial success, and though it may be an exceptionally fine variety in Europe, it does not seem to be adapted to our climate, at least as a forcing Rose. One great objection to it is its tendency to produce a large percentage of unformed flowers during the winter months, though this trouble has been partially removed by grafting it on Manetti, by which means a more vigorous growth and better flowers have been secured than when the Rose is grown on its own roots. But even under the most favorable circumstances, the large proportion of knotty, greenish-colored flowers has been a noticeable feature in a house planted with the Puritan.

Another objection to this Rose urged by some lovers of the beautiful, is that the growth and flower stems are so erect and coarse as to give a very stiff effect unless most carefully arranged, though it must be admitted even by these critics that a large bunch of long-stemmed Puritans loosely arranged in a vase is very beautiful indeed.

One point in favor of the Puritan is that it is an excellent keeper, retaining its freshness after cutting for as long a time as any variety with which we are familiar. In regard to treatment, it may be said that in the establishment of its introducer (where probably as good a result has been obtained with the Puritan as anywhere in this country) it is planted in moder-

advisability of infusing the blood of *Rosa Indica* into these plants, for it at once lessens the hardiness of varieties thus produced, and also, in great measure, destroys the simple charm of their flowers by producing varieties that are types of neither class; too large for Polyanthas and very insignificant as Teas. One of the most distinct and beautiful sorts introduced so far is Madame Georges Pernet, an exquisite shell-pink in color, often deepening to a rich crimson at the centre; larger than others of the dwarf section, but retaining the original flat, open form of the family. It is wonderfully profuse in the production of its clustered flowers, and all who see it are captivated by its simplicity and the richness of its coloring.

Richmond, Indiana. *E. G. Hill.*

Orchid Notes.

Lælia anceps Dawsoni.—Ever since this, the gem of all the white varieties of this species, made its appearance in European gardens, it has been the admiration of Orchid lovers. Some twenty years have now elapsed since its introduction, and during that period importers have failed in their many efforts to obtain a supply, consequently it still remains a very rare plant. They have, however, been successful in discovering several white forms which are very beautiful, but the variety under note has not yet been equaled for form and loveliness. The whole flower is large and round, its sepals and petals being of the purest white, the latter being remarkable for their extraordinary breadth, having a lip blotched with rich purple, and the throat handsomely veined with the same color. A specimen with a dozen flowers is now adorning the Cattleya house of Mr. F. L. Ames, at North Easton, Massachusetts.

Summit, N. J. *A. D.*

Phalænopsis gloriosa.—This is one of the latest additions to this beautiful genus. It is presumed to be a natural hybrid between *P. amabilis* and *P. grandiflora*, its habit and inflorescence assuming a character intermediate between these two species. It appears to be a very robust grower, and excepting in this respect it is by no means an improvement on either of its supposed parents. But not so with the hybrids of *P. Schilleriana* and *P. amabilis*, namely, *P. casta* and *P. leucorrhoda*. These are among the most beautiful of the whole genus, the former having bronzy green leaves, while the latter has the marbled leaves of *P. Schilleriana*. They vary little in the inflorescence, the flowers resembling those of *P. amabilis* in form, being pure white, with the base of the segments tinged with rosy lilac, and the lip beautifully speckled and marbled with purple. Some fine examples of these are now in full beauty here, bearing many flowered branching spikes. A rare variety of *P. leucorrhoda* (var. *alba*) is also in flower. This plant varies from the type in the color of its flowers, which are almost white. Another beautiful hybrid Phalænopsis is *P. intermedia Brymeriana*. This is a rare kind, differing from the type in its long, narrow leaves, which are pale green and speckled. The flower spike is deep green and more in the way of *P. rosea*; the flowers are white, suffused near the centre with rose, while the lip is a rich amethyst color. The handsomest and most interesting hybrid at present in flower here is *P. Harriettia*, a hybrid between *P. amabilis* and *P. violacea*, and previously noted in these columns. This plant improves greatly in size and color each year as it gets stronger. *F. Goldring.*

Kenwood, N. Y.

Zygopetalum Mackayi.—This is by no means a new or expensive plant, having been introduced from Brazil in 1825. I consider it one of the very best amongst the autumn and winter flowering Orchids. It grows and flowers profusely under green-house treatment, not requiring as much heat as some of the other species of this genus. If grown in too warm a temperature the leaves are very liable to become spotted, which detracts very much from the beauty of the plant. For florists' purposes, like filling a large centre piece for table decoration, three or four spikes of this plant in the centre with other Orchids surrounding them would make a fine show. The flower-stalk or raceme grows from one to two feet in height, with large, purplish blue and white flowers, which emit a very delicate fragrance. The cultivation of this Orchid is very simple, for it will grow equally well in either rough loam or peat-soil if it only has good drainage. The pot should be about half full of crocks to secure that result. It should have plenty of water when in active growth, and even when dormant should be kept moderately moist. *Geo. Savage.*

Rochester, N. Y.

Plant Notes.

The Banyan Tree.

A REPRESENTATION of one of the most remarkable trees now known appears in our illustration upon page 43. It is the great Banyan tree in the Botanic Gardens upon the banks of the Hoogly, below Calcutta, and the only survivor of many hurricanes among the large trees which long made this garden famous. It is believed to be only a few years more than a century since the seed from which this tree sprang was dropped by a passing bird into the crown of a wild Date Palm. The main trunk is now, however, according to the latest statistics which have been published in regard to this tree, forty-two feet in circumference; there are two hundred and thirty-two additional trunks, many of them eight or ten feet in circumference, and the branches extend over an area eight hundred and fifty feet in circumference, and form a dense canopy of perpetual verdure, through which the sun never penetrates.

The Banyan (*Ficus Indica*), like many species of the genus, springs from seed dropped upon the bark or in the crown of some other tree. The young plant as it grows sends down its roots, which finally reach the earth, and, increasing in vigor, finish by strangling their host. These roots grow together and form the nucleus of the main stem of the future giant. The branches send down to the ground in turn roots which, in time, become trunks, and so the tree goes on, spreading farther and farther, until it may, in time, cover acres of ground with its branches and afford shelter to thousands of men. The famous Banyan upon the banks of the Nerbaddo, beneath which Alexander the Great is said to have camped, once sheltered—if the story is a true one—7,000 men; and in the present century, although much reduced by the washing away of some of its trunks by floods, this tree has measured nearly 2,000 feet in circumference and has had more than 3,000 stems.

The tree in the Calcutta garden has been well cared for, and every effort has been made to induce it to develop new trunks to support the gigantic limbs which spread out horizontally about ten feet from the ground, as appears from the following extract from Hooker's "Himalayan Journals," published in 1855, in which a most interesting account of this tree may be found: "The props are induced to sprout by wet clay and moss tied to the branches, beneath which a little pot of water is hung, and after they have made some progress they are inclosed in bamboo tubes, and so coaxed down to the ground. They are mere slender whip-cords before reaching the earth, where they root, remaining very lax for several months, but gradually, as they grow and swell to the size of cables, they tighten, and eventually become very tense. This is a curious phenomenon, and so rapid that it appears to be due to the rooting part dragging down the aërial. The branch, meanwhile, continues to grow outwards, and, being supplied by the new support, thickens beyond it, whence the props always start outwards from the ground towards the circumferance of the tree."

The Banyan, as this particular species of the Fig is called, although several others (including the Florida species figured upon page 128 of our first volume) spread by supports developed from aërial roots, has large coriaceous, dark green leaves, five to six inches long by three or four inches broad, and somewhat pubescent on both surfaces. The figs are the size of cherries.

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

IV.—THE DESTINATION OF THE LIQUIDS ABSORBED BY ROOTS.—EVAPORATION OF WATER FROM LEAVES.—INTERRUPTION OF THE WATER CURRENT.—EXTENT OF ROOT SYSTEM.

SOME very interesting facts appear when we compare the amount of roots in any given plant with the spread of foliage. One of the earliest recorded comparisons is that of Hales, in 1731, who gives the following figures in regard to Sunflower, three and one-half feet high. There were "eight main roots reaching fifteen inches deep, and sideways from the stem; it had, besides, a very thick bush of lateral roots, which extended every way in a hemisphere about nine inches from the stem and main roots." Adding together all the different measurements, he found the roots were no less than 1,448 feet in length, and the entire surface to be 2,286 square inches, or about sixteen square feet. The leaves of the same plant measured 5,616 square inches, or about thirty-nine square feet.

Recent estimates give the following ratios of the parts below ground to those above ground:

Silver Fir,	169:100
Norway Spruce,	267:100
Scotch Pine,	477:100
Hales' ratio would be for the Sunflower,	41:100

But from what was shown in the last paper, these figures are very misleading, since they do not take into account the surface of the root-hairs in the case of the Sunflower. In *Abies pectinata* and some other Gymnosperms, no perfect root-hairs are discoverable; the work of absorption is here* carried on by the delicate cells just behind the tip, which are sometimes branched, but do not take on the regular forms of ordinary root-hairs. When root-hairs are present in abundance, as in the Sunflower and by far the greater number of all our plants, the absorbing surface is surprisingly increased. Estimates of the amount of increase can be only approximate, but the following are given by authors: In some instances the surface is five times, and, in others, fifteen times greater than without them. It should be borne in mind that roots of some plants, especially trees, run through the ground to very great distances, such as those commonly planted for shade.

The absorbing rootlets, with their zones of absorbing cells, lie far away from the base of the trunk, and extend even beyond the eaves of the canopy of foliage, where it would seem as if the supply of water during a rain might be shed rather more abundantly. In any event, the absurdity of watering a shade tree near the trunk in time of drought is apparent. The strong root-branches near the trunk are for mechanical support, and take no part in the process of absorption from the soil, except to transfer what the rootlets far remote from them take in.

THE PATH OF TRANSFER.—The dilute aqueous solutions from the soil absorbed by the rootlets are carried to the leaves.

*There is possibly another mode in which these rootlets absorb nutriment from the soil. This will be considered later.

This transfer in our woody plants is effected wholly through the younger woody part of the stem, as will presently be seen, but in our herbaceous plants the transfer is through the cells of soft tissues, especially those which are unhardened elements, answering to what is true wood in our woody plants.

When a girdle of bark is removed from the trunk of a forest tree the leaves remain for a time, frequently for a season, or even more, about as fresh as ever; but as the wood begins to yield to the invasion of decay, the transfer of liquids from the roots to the leaves is more or less completely checked, and the tree dies. On the other hand, if, after having built up a staging around a tree to give it enough support to keep it in place, we should cut out all the wood of the trunk, leaving the bark, the transfer of liquids from the roots would be checked at once and the withering of the leaves would follow in a single day. Thus, by these two experiments, it is easy to prove that the path of readiest transfer of liquids from the roots is in the woody part of a tree trunk. This transfer is, in no sense, a circulation.

STOMATA, OR BREATHING-PORES OF LEAVES.—The leaves are practically continuous in their tissues with the fabric of the twigs, and, therefore, with the branches and main stem, just as the main stem is continuous with the main trunk and larger divisions of the roots and these latter with the rootlets. There is an unbroken connection between the rootlets, with their absorbing cells in the ground, and the thin tissues of the leaves exposed to the air. Now, from the thin tissues of the leaves water evaporates.

The external surfaces of the leaf are waterproofed by a substance known as cutin, which covers every part of the exterior, except at certain openings, chiefly on the under side, known as breathing-pores or stomata. These are so numerous in a single leaf as to be counted by hundreds of thousands.

They are, in fact, delicately-balanced valves of very minute size, which are so perfectly governed in their working that they can control the amount of water which is lost by evaporation through the otherwise impermeable covering of the leaf surface. The relations which these bear in point of number and method of construction to the peculiar surroundings of swamp and desert plants, are among the most interesting in the whole range of exquisite adaptations among plants. It is enough to say, at present, that the amount of water lost by evaporation, under ordinary conditions, is not larger than the roots can readily supply. When a greater demand is made on the roots than they can meet, the deficiency is revealed promptly by the wilting of the lower leaves and afterwards by those higher up on the stem. By this wilting the amount of evaporation is temporarily lessened, and thus a chance is afforded for the loss to be made good.

Recalling what was pointed out in the third paper of this series, namely, that the water throughout the plant is practically continuous, surrounding, as it does, in the form of films, each structural molecule of the whole plant, the current of water to meet that which is lost by evaporation through the stomata is uninterruptcd as long as the supply from the roots holds good. But when the soil is relatively cold, the current is checked and the leaves wilt, as can be easily shown by a simple experiment. But the most common interruption is, of course, caused by too great dryness of the soil. Soil may and frequently does appear dry, and yet may have plenty of water clinging to its particles, affording an adequate supply for the plant, but when a certain limit of dryness beyond this is passed, the plant feels it and shows it. By the wilting of the lower and afterwards of the upper leaves, the evaporation is checked, and unless the interruption is too long continued, the current can be resumed when more water is supplied to the soil.

When a branch is cut off the current is arrested at once, and is not resumed completely, even if the cut end is plunged instantly in water. But it is an interesting fact that the leaves keep fresh longer if the branch *is cut off under water;* in this case, interruption of the current, even for an instant, is avoided; the continuity of the water system in the plant is unbroken. It is possible, in this way, to keep some branches fresh until decay of the cut surface begins.

It is said by Mr. K. Miyabe to be a common practice in Japan to cut with care flowering branches of ornamental shrubs and trees for decorative purposes, and to char the cut ends quickly and thoroughly before placing them in the water of the vase. By this simple plan, which prevents the attacks of fungi, causing decay, the branches remain fresh for a longer time than in any other way. Repetitions of this practice in Cambridge, last summer, showed great differences in this respect between different plants.

A modification of the practice of cutting off branches under water, to make them keep longer unwilted, is easily managed, namely, by making a second cut after the piece is put in water. The amount of water lost by evaporation differs according to various circumstances, such as the temperature of the air, the amount of moisture in the air, and so on, but the following figures may be of interest, although they are, at best, only rough estimates. Professor Prestwich, quoted by Rolleston, states that a tree of average size gives off two and one-half gallons of water per diem.

Hartig gives, as his estimate, about three pounds to an average tree of twenty years' standing.

Hales found that the Sunflower previously referred to in this paper, gave off about a pound and a third every day.

Evaporation of water from the leaves concentrates the dilute solutions of mineral matters brought up from the soil, (2) it drains the soil to a certain extent, and lastly (3), it adds a certain amount of moisture to the air. But these effects on the plant, the soil and the air have so many practical bearings, that they must be deferred for special consideration.

Cambridge, Mass. *George Lincoln Goodale.*

The Forest.

The Forests and Woodlands of New Jersey.*—II.

A PURE FOREST.—There is a pure forest of Pitch Pine (*Pinus rigida*) near Lakewood, in Ocean County.† The trees are fifty or sixty feet high, and they average about ten inches through. No underbrush grows among them, nor anything but moss. The ground on which they stand was cultivated a half a century ago, and this piece of forest shows that under favorable conditions trees grow much faster than most persons believe. The land here would have very little value for any other use, and this is true of a great deal of land in southern New Jersey. It cannot be made so valuable in any other way as by perpetuating forest growth upon it. Few things would be of greater benefit to this region than the recognition by its land-owners of the fact that Pitch Pine is a good crop.

CHANGES IN THE WOODLANDS.—There has not been much change in the condition of the woodlands of New Jersey during recent years, except what has been produced by the fluctuation which is always going on in the local industries in different parts of the state. As a consequence of this fluctuation there is some variation in the market for fuel and other products of the forest. In some districts of northern New Jersey lime-burning has been actively carried on for the last few years, and wherever this is the case it creates a demand for wood, which gives employment to many men as wood-cutters and teamsters, and considerable tracts of timber are cut off which would otherwise be allowed to stand longer. The profitableness of forest-lands thus depends so largely upon local conditions that no general statement can be made regarding it. The establishment of a lime-kiln or other wood-consuming industry may render investments in forest-lands in its immediate vicinity profitable when they would not have been so without it. Considerable movements of the population of some portions of the mountain region in the northern part of the state have sometimes resulted from such changes in local industries which depend more or less directly on the supply of fuel and other forest-products. Between Deckertown and Brick House, and in other parts of this hill-country, there are hundreds of places still plainly marked by old Apple and Cherry trees, or by the mounds where the chimneys have crumbled down, where once stood the cabins of woodsmen. A new forest growth crowds and chokes the fruit-trees planted by these transient settlers, and vigorous Oaks and Chestnuts are growing in the very places where once the fire burned bright on the family hearth. An old resident of that part of the state told me he remembered when those woods were full of people, and mentioned having once been present at a Democratic mass-meeting at a remote point which he named, when there were hundreds in attendance; and he added, by way of emphasis, "Where are those Democrats now?"

BEAUTIFUL SCENERY.—There is a great deal of beautiful scenery in northern New Jersey, and more and more of the people of New York City will doubtless go to this region to live. Many thousands of them have already established their homes for the summer, or for the whole year, in the highlands of this state which lie nearest the great town; but the movement will go on increasing, and the beautiful hill-country, which is still further away, is certain to attract multitudes of

*From advance sheets of the Report of the Geological Survey of New Jersey.

†An illustration of the Lakewood forest appeared in this journal, on page 164 of Volume I.

men and women who value the healthful conditions of life in a region of hills and forests. All such persons have, whether they think about it or not, a vital interest in the treatment of forest-lands and trees, and in the diffusion of knowledge and the development of intelligent sentiment regarding these subjects. Unless thought and intelligence are applied to these matters, the beauty which now attracts people to these regions will be in a great measure destroyed by the advent and operations of a considerable population.

The Southern Pine Barrens.—The southern part of the state is rather monotonous in appearance, and in winter it is desolate looking and uninviting. But the winter is short here, and during the remainder of the year the Pine country is to the botanist one of the most attractive and interesting regions of the United Sates. There are many beautiful and interesting plants here, some of them extremely local, and others very rare. The queer little Fern, the *Schizæa pusilla*, is found nowhere else in the world, I believe, and many southern plants are found here which go no further north, while, on the other hand, many plants come down from the north as far as this, but are not found farther south, so that the flora of the region is remarkably rich, copious and interesting.

It is probable that the next few years will bring increasing changes in the woodlands of this part of the state. The chief value of the region depends upon its climate and upon the sanitary influences of its Pine forests. There is probably no part of the world which is healthful for everybody. I have known people who received decided benefit by removal from southern New Jersey to northern New England. But there are many thousands of persons in New England who are oppressed and depressed by the rigor of the northern winter who would be greatly benefited by removal to southern New Jersey, and some of them would live many years longer in this salubrious region than they are likely to do if they remain in their northern homes. Many such persons have already come here from Maine, Massachusetts, New Hampshire, New York and other states, most of them going into the towns to live. But the true place for such health-seekers is in the Pine woods.

The poorest people cannot well come, for there would be no way for them to make a living. The land in southern New Jersey is not rich, and some capital is required for successful farming here. It is never wise to go to a new or unknown region to live without some direct personal examination of the country and its resources. It is not judicious to make a change by which so much is placed at risk on the strength of any report whatever—not even on the one which I am now writing. I wish merely to point out the fact that during the next few years there is likely to be a gradual and considerable increase in the demand for forest lands in southern New Jersey and a consequent advance in prices. The people who should come here from the states farther north are those who have sufficient means to live without any very profitable industry; whose investments yield an income which will support them, or nearly support them, and whose health would be improved by living here. For such persons fruit-raising, gardening or farming in this region would be a most healthful and pleasant recreation—if they like that kind of work. But the real reason for their coming here is to be found in the comparative mildness of the winters, in the soft yet bracing atmosphere, and especially in the great number of days in the year when any man or woman who can be out of bed can live out-of-doors.

The woods of southern New Jersey should not be cut off. The land now in forest ought never to be cultivated—not much of it. The whole Pine region ought to be gradually filled up by a population able to live without much general agriculture. The country is naturally fitted to be a great sanitarium, and there will soon be an imperative need that the people who are to live here shall learn what are the true uses of the forests, and how they can be permanently preserved and made most valuable to their owners. *J. B. Harrison.*

Franklin Falls, N. H.

Correspondence.

A Horticultural Register.

To the Editor of Garden and Forest:

Sir.—I read with interest the remarks on nomenclature by Mr. R. J. Halliday at the Florists' Convention in New York, and the editorial remarks on the subject in your paper. This is a movement in the right direction, and I hope the committee appointed to determine names by which flowers shall be known will be successful.

While approving everything done in this direction at the convention, I wish to submit a supplemental suggestion.

When the names have been definitely fixed they should be registered, with Number, Name, Description and History, in a book, or series of volumes, to be called the *American Horticultural Register*.

In this register should be recorded, first, the names of all varieties of flowers, fruits and plants which are now cultivated, to be followed with new varieties as they are originated and found to be worthy of propagation. This register should be authorized by the association, and kept by, or at the office of, Garden and Forest, and new varieties could be submitted and recorded, and a certificate be furnished the originator. A separate series of numbers should be devoted to each flower, fruit or plant—for instance, make a separate list of Roses, Chrysanthemums, Pansies, Apples, Pears, Grapes, Ferns, and then number each list separately, commencing each with number one, and continuing the lists and numbers as new varieties are offered for registration.

Every one can see the advantages of a system of this kind, without enlarging upon them.

The system of registering fine live stock is well known, different registers being opened for the various kinds, such as trotting-horses and thoroughbreds, short horns and Jerseys, and so on. Flowers, fruit and plants can all be as well included in one register.

Some of the numbers of such numerous families of flowers and fruits as Roses, Chrysanthemums, Grapes, might become so familiar as to be used in some cases in place of names. Any one knowing anything about trotting horses knows that Hambletonian 10 is Rysdyk's Hambletonian.

The American Trotting Register is kept by John H. Wallace, of New York, editor of *Wallace's Monthly*, under the supervision of the National Association of Trotting Horse Breeders, and a fee is charged for registration, which, I suppose, pays all expenses of keeping the register.

Walnut Creek, California. *A. L. Bancroft.*

[Our correspondent hardly needs to be reminded that herd-books and stud-books are prepared for purposes quite distinct from those which it is proposed to secure by this system of plant-registration. Individual animals are registered in order that they may be identified, that their pedigree may be established, and that purity of blood may be maintained in a given breed or strain of live stock. In the case of plants, however, where a single registration is made for all the individuals of a given variety, and where the parentage of a plant is often unknown and always of secondary importance, it is difficult to see how a register would prevent the evils complained of. The concerted action of florists and nurserymen to prevent "substitutions," and to insist upon the abolition of duplicate names in the trade, is one step in the right direction, and the organization of some authoritative body, who shall issue certificates for plants and fruits of merit, and to whom appeal can be made in cases of doubtful identity, is another.—Ed.]

Fruits for Cold Climates.

To the Editor of Garden and Forest:

Sir.—Under this title some late articles from Vermont have been extremely interesting to western people, as showing how the question of adapting Russian fruits to American conditions looks to one in the far north-east. But some of the views must be profoundly modified to suit the longitude of Iowa.

The writer truly says, "In the prairie states intense summer heat and drought and the fatal sap blight must be encountered." Then he adds: "The fruits of the Russian and Asiatic Steppes furnish the best material to meet these contingencies." In this last statement the writer has certainly been misled by incautious statements. The best and most conservative horticulturists of the prairie states are not satisfied with the past performance of Russian fruits, nor hopeful of their future success here.

The Russian apples, from which most has been hoped, have developed in the prairie states three serious (and with most varieties fatal) defects, (1) winter-killing, (2) sap blight and (3) unfruitfulness, to say nothing of the poor quality and early decay of most of the fruit produced.

During the season just past the sap blight has ruined some varieties upon which the highest hopes had hitherto been built. This disease has made our nurseries and orchards of Russian Apples look like a typical case of measles after the

disease has "come out." I have lately attended a meeting of the Horticultural Society of eastern Iowa and the meeting of the society of western Iowa, and failed to hear even one variety of Russian Apples—or any other Russian fruit—commended as reliable for general cultivation in Iowa.

Regarding Russian Pears and stone fruits, no man can say that any one variety has yet shown reasonable ground to expect of it permanent usefulness in any single region of the west. The truth is that experience on the prairies has thus far failed to justify the expectations raised by the over-hopeful introducers of Russian fruits. The failures have not all been proclaimed. We are awaiting further trials, but without enthusiasm.

It would be interesting to know upon what authority Dr. Hoskins bases his belief that "The Russian tree fruits are undoubtedly of hybrid origin; . . in the valley of the Volga and the Steppe region the influence of north Asia stock preponderates." De Candolle, who had been supposed very high authority, takes a diametrically opposite view, saying of the Apple: "The lack of communication with Asia before the Aryan invasion, makes it probable that the tree was indigenous in Europe, as in Anatolia, the south of the Caucasus and northern Russia, and that its cultivation began early everywhere."

The names of a large portion of the Russian fruits received in the west indicate a German origin.

Des Moines, Iowa, December 24th, 1888. *C. L. Watrous.*

Periodical Literature.

A supplement published with the Christmas number of the *American Florist* gives one a good chance to see the average level attained by our florists in the preparation of "set pieces" and floral decorations for public and domestic buildings on festal occasions. It contains more than seventy pictures of such designs, ranging from small baskets and bouquets to altar decorations, including a number of arrangements for funerals and weddings. In many cases great ingenuity is shown in the application of flowers to would-be decorative purposes; but, unfortunately, in many instances it is ingenuity misapplied. In one picture we see an upright piano swathed with roses in a way that could hardly be improved upon, if it is assumed that so to enwrap a piece of furniture is a task that good taste can sanction. And the artist who constructed the "Funeral Design of Jacob's Ladder, or the Golden Stairs," or the "Floral Table," or huge "Floral Butterfly," must have possessed a degree of skill which might profitably have been devoted to a better purpose. Among the worst things in the collection are those which show the manner in which certain public monuments had been treated on Decoration Day—notably the Farragut statue on Madison Square, where "the old Salamander" is made to look ridiculous with a huge wreath encircling his body, while the sculptured base is entirely concealed by ugly constructions representing ladders, swords, cannon and a steamship at sea. Some of the chancel and staircase arrangements of foliage plants, on the other hand, are very good; and nothing in the shape of a set piece could be better than the "Trinity Cross," composed chiefly of Lilies and very graceful in shape. A simple and appropriate funeral wreath is one formed of four Palm branches held together by two bunches of Lilies-of-the-Valley, and some of the little baskets filled with only one or two kinds of flowers are also pretty. But too many of the baskets shown are far too elaborate for their purpose, and we find that even the perverted taste for baskets in the form of shoes, hats and other objects wholly inappropriate for association with flowers, still persists. On the whole, the collection of pictures proves that good taste is by no means absent in this community, which uses cut flowers more profusely than any other in the world, but that there is still great room for improvement, and much need for the cultivation of greater simplicity and a truer appreciation of what the beauty of flowers really is.

It appears from an interesting article published in the December number of the *Druggist's Bulletin* that the annual crop of the American Ginseng-root, which for the last twenty years has amounted, on an average, to 400,000 pounds, is all exported to China. The first shipments are said to have been made in the year 1718 through the agency of the French missionaries in China. The American Ginseng (*Aralia quinquefolia*) grows in the dense forests from Canada to the high mountains of Carolina and Tennessee, and from Maine to the Mississippi. It has a stout root, three to six inches in length, divided into two lobes at the base, which is usually harvested before the ripening of the seed, a practice which is gradually exterminating the plant. The demand, however, is steadily increasing, while the production in late years is falling off, so that the price at the present time has risen to two dollars and a half a pound. The maximum export of 600,000 pounds was reached in 1860, since which time it has gradually diminished, and is now lower than the average of the last forty years; and it seems to be only a question of time when the Ginseng will be exterminated, unless the time of gathering the roots can be regulated so that the seeds may ripen and fall before the roots are dug.

Various attempts have been made to cultivate the Ginseng, especially in New York, Pennsylvania and Wisconsin, but no satisfactory results have yet been reached. Large roots, which are the only ones that find a ready sale at remunerative prices, have only been produced from plants grown naturally in the shade of dense forests. As is well known, the roots of the Ginseng have no medical value whatever, and their use by the Chinese from time immemorial seems based upon some popular superstition in regard to this plant. But whether it is valuable or not, it is an important article of export, for which there is, and probably always will be, an active demand; and it seems for the interest of the communities in which this plant grows to prevent its extermination by legislation, for the same reason and in the same manner that game is protected during a certain part of each year.

In a late number of *Nature* it is stated that at the meeting of the Scientific Committee of the Royal Horticultural Society on November 13th, Mr. Henslow showed specimens of several species of plants which are propagated by cleistogamous flower-buds. By that means, while retaining a dwarf habit, they are able to multiply very rapidly, and to extend over considerable areas in a tennis-lawn. Although none of them are perennials, they remain so reduced in size that they are not exterminated by the mowing-machine periodically cutting them down. The result is that each species has more or less covered certain patches of ground, to the almost entire exclusion of everything else. The plants in question are *Cerastium glomeratum*, *Montia fontana*, *Trifolium procumbens*, *Sagina procumbens*, *Alchemilla arvensis*, *Veronica arvensis* and *Poa annua*. Mr. Henslow added that he had observed, many years ago, *Trifolium subterraneum* flourishing in the same way in the close-cut grass in Kew Gardens, on the site of the present rockery.

Recent Plant Portraits.

PINUS LARICIO, *Gardeners' Chronicle*, December 15th; a portrait of the specimen growing in Kew Gardens near the principal entrance, and planted by R. A. Salisbury in 1814.

SATYRIUM CARNIUM, *Gardeners' Chronicle*, December 15th.

FICUS ROXBURGHII, *Gardeners' Chronicle*, December 15th; an admirable reproduction of the frontispiece to Dr. King's monograph of the south Asia Figs, showing the curious way in which the abundant fruit of this species is produced. "*Ficus Roxburghii*," to quote from the columns of our contemporary, "is a native of the lower and outer Himalayas from Nepal to Bhotan, being found at elevations of from 1,000 to 3,000 feet. It is a tree from fifteen to twenty-five feet in height, and with a wide, spreading head. The leaves are large, measuring from one to one and a half feet in length, and from twelve to fifteen inches in breadth. The most striking feature in the tree is, however, the great abundance of its handsome, russet-red figs. These figs, in shape and size, much resemble Dutch turnips. They are carried in enormous bunches on the stem, especially near its base, and smaller bunches on the main branches. The mass of figs borne at the collar of the stem on this singular tree at the time when it was photographed, as Dr. King informs us, was about a hundred weight. The fruit, however, although eaten by the unfastidious Indian laborer, is quite unpalatable to a European, being insipid and sloppy."

ARBUTUS ANRACHNE, *Gardeners' Chronicle*, December 22d; a view of a fine specimen tree in Kew Gardens.

STAPELIA GIGANTEA, *Gardeners' Chronicle*, December 22d.

LODOICEA SEYCHELLARUM, *Gardeners' Chronicle*, December 22d; a figure showing the method of germination of this plant—the so-called "Double Cocoanut."

PASSION FLOWER, WOODHATCH HYBRID, *Gardeners' Chronicle*, December 22d; a hybrid raised in an English garden between *P. racemosa* and *P. quadrangularis*.

CRATÆGUS MEXICANA, var. CARRIERI, *Gardeners' Chronicle*, December 22d; from a specimen in Mr. Gumbleton's garden, near Cork, in Ireland.

Notes.

More than twenty million pounds of raisins were packed in California last year.

Tomatoes growing in the open air were picked fresh from gardens in Santa Rosa, California, on Christmas day.

Small Holly-trees three or four feet high were imported from England for holiday decorations, and are still seen in many windows in this city. They were, in most cases, symmetrical and well formed, superior both in berry and foliage to the loose Holly imported in crates. In addition to the ordinary form were shapely little trees with variegated foliage and golden berries.

The range of the Post Oak (*Quercus obtusiloba*) may be extended eastward to Brewster, on the border of Chatham and Harwich, in Massachusetts, where Professor Farlow informs us that he has detected this tree in what is the only station reported for it on the mainland of Massachusetts. This, Professor Farlow tells us, is also the most eastern station of *Lachnanthes tinctoria* known.

Professor Church has recently given an account of his analysis of the tubers of *Stachys tubifera*, the new Japanese vegetable, from which it appears that they contain 78 per cent. of water, 1.5 per cent. of albuminoids, 1.7 per cent. of non-albuminoids, 16.6 per cent. of sugar, .7 per cent. of fibre, .1 per cent. of ash, .2 per cent. of fat, with a trace only of starch. A comparison of this analysis with that of the Potato shows a much larger amount of water, and rather more flesh-forming albuminoids than are found in the Potato, and that the sugar replaces the starch, which the analysis of the Potato shows to be 15 per cent.

A correspondent calls our attention to an error in the account of the "Washington Oak at Fishkill," published in our issue of December 19th, 1888. William Denning was described as Washington's Adjutant-General, upon authority which seemed adequate, and without reference to the rolls of the Colonial Army. It appears, however, upon further investigation, that Mr. Denning held no commission in the army, although as a patriotic citizen of Orange County in this state, eager to aid in supplying the army, his relations with the headquarters during Washington's residence in Newburgh were, his grand-daughter informs us, intimate and cordial.

Herr Max Leichtlin writes to *The Garden* that the fungus disease which has caused such serious damage to Christmas Roses in Europe is probably induced by a disregard of the natural conditions under which these plants have been produced. In their wild haunts they thrive in shady nooks in loamy soil, with no other added nourishment than the decaying leaves supply. In cultivation they are often kept in sandy soil that has been highly manured, and planted in the open sun. The remedy is to wash off the roots, replant in a border which has been filled in for a foot with fresh loam, and which is shaded for a portion of the time at least, in mid-day; then mulch with half-decayed leaves and let the plants alone.

A tersely written Bulletin from the California Board of Forestry calls the attention of the citizens of that state, and especially of the farmers and irrigators, to the dangers that threaten their interests from the destruction of mountain-forests. The wasteful and ruinous methods of cutting timber, the increasing damage by fire, land-laws that invite fraud, the neglect of the school forest-lands, all combine to rob the people of their rights. The Board asks the people to urge upon Congress to withdraw all Government timber-lands in the state of California from sale or entry, and to insist that certain lands be maintained permanently in forest to guarantee verdure on the water-sheds and preserve the springs and streams.

Of tomatoes there were packed last season 3,319,437 cases of two dozen tins each, or a total of 79,666,488 cans, costing at points of production about $6,000,000, and reaching consumers at a total expense of $8,000,000. The total pack in 1887 was 2,817,048 cases. The canning industry has grown rapidly in the Western and Southern States, largely reducing the demand upon Baltimore, Philadelphia and New York for such goods. In a few years each section of the country bids fair to supply its wants from home canneries. The leading points of production are Maryland and Virginia, credited with 1,118,733 cases; New Jersey, 788,363; Delaware, 227,030; New York, 197,432; Western States, 796,599; Eastern States, 43,360; Canada, 73,990.

Baron Eggers, well known for his botanical explorations in Saint Thomas, San Domingo, and more recently in the Bahama Islands, is about to engage in an examination of the flora of the high mountain ranges of the eastern part of the Island of Cuba, first made known by Charles Wright twenty-five years ago. Some of the highest summits of Cuba reach an elevation of about 9,000 feet, and as these mountains have only been partially explored, Baron Eggers may be expected to add a considerable number of species to the Cuba flora. Baron Eggers, who may be addressed to the care of Messrs. Brooks Brothers & Co., Santiago de Cuba, will be prepared to furnish sets of Cuban plants for ten dollars the 100 specimens, delivered in this city.

A correspondent in Germantown sends us a box of the deliciously fragrant flowers of Chimonanthus, the east Asian representative of our Calycanthus, or Sweet Shrub. The flowers of Chimonanthus are rarely seen in this climate in good condition, as they appear in January, and are destroyed by cold as soon as they open, in ordinary seasons. The flowers are pale yellow or nearly white, and purple on the inner face of the petals. They appear before the leaves. If this shrub, which is quite hardy here, is planted at the north, a very sheltered spot near a building should be selected for it, in order to secure as much protection as possible for the flowers. Chimonanthus in the extreme Southern States is one of the most delightful winter-blooming shrubs which can be planted in a garden.

A correspondent of the *Independent*, writing from Orleans, Illinois, makes a strong plea for the Barberry as a hedge-plant. "Planted in hedges," he truthfully explains, "the Barberry is a bower of beauty from the time its pendulous racemes of yellow bells swing in the spring sunshine throughout the winter, when the scarlet berries blush under veils of snow and sleet." Moreover, the Barberry has practical value as well as beauty to recommend it. It "makes a sauce which rivals the Cranberry in excellence, ... and has sufficient juice to make most delicious jelly, especially if mixed with apple juice, which relieves the tartness and enhances the beauty of the color." The bark, too, we are told, is useful for tanning purposes, the roots for dyeing yellow, and the berries as a source whence malic acid may be extracted.

"The fundamental difference," says a recent writer on Japan, "between Japanese and foreign methods of adjusting culled flowers has often been remarked. With us the general idea is to produce a bouquet in which the richest variety of color can be obtained—a sort of crush-concert of hues in which individual form and beauty are almost lost. The Japanese florist, on the other hand, prefers to display the natural lines of stems and branches, and to exhibit the subtile shapes and colors of each bud and blossom in an open and well-balanced composition. The same subordination of color to form and the same simple naturalness as opposed to ostentatious artificiality, are to be observed in even the minutest details of Japanese gardening. Grouped masses of similar flowers are not wanting in some parts of the native gardens, but there is no attempt to arrange them into color patterns and geometrical designs.

We referred not long ago to the fact that perfume making from fresh flowers was becoming an established industry in our Southern States. A recent letter to the New York *Tribune* describes some of the processes employed in Florida, and declares that their results are so excellent that "now it is claimed that attar-of-rose can be made in Florida with as much success as in the gardens of Bulgaria." The two chief processes used are distillation, and absorption, or "enfleurage," the latter being resorted to in the case of the more delicate flowers, whose perfume is found to be injured by heat. It is based on the "established law of affinity which hydro-carbons have for perfumes. When these have been highly purified they catch, and in catching concentrate and intensify, the odors communicated to them." A perfume factory where this process is used contains multitudes of wooden frames with rims about three inches in depth, in which are set several sheets of glass. Each sheet of glass is spread with a layer of pure fat, and over this fat are sprinkled the petals from which the odor is to be obtained. The sheets are piled closely on one another in the frame, the frame is slid into a tight-fitting box, and in a short time the fat absorbs all the odor. The fat is then cut up into small squares and immersed in alcohol, when "the delicate essence at once parts from its coarser companion, and, uniting itself to the alcohol, is fit for the market." Another method is to strew the petals on cloths saturated with oil, and when the odor has been absorbed, to put the cloths in a press and squeeze out the impregnated oil.